

WHAT IS CLAIMED IS:

1. In a dual mode target designation system having an IR detector co-boresighted with a laser range finder, a method for actively adjusting at least one of the boresights to be aligned with the other of the boresights comprising the step of:

providing a closed loop system for correcting the boresight of the laser based on a comparison of reported target positions from the IR detector and laser range finder reported position.

2. The method of Claim 2, wherein the boresight of the laser is adjusted by repositioning a laser transmit mirror.

3. The method of Claim 3, wherein the laser is made to execute a search pattern to scan around a target identified by the IR detector.

4. The method of Claim 3, wherein the target designation system includes detecting a target cloud with the IR detector and refining the position of targets within the target cloud through the use of the laser range finder, the closed loop correction reducing scan time when identifying the position of subsequent targets in the target field.

5. The method of Claim 2, wherein the closed loop system includes using a mapping system for adjusting the position of the laser transmit mirror, and wherein the mapping system is updated with the results of the comparison of reported target position from the IR detector with reported target position from the laser range finder.

6. The method of Claim 5, wherein the step of correcting the boresight of the laser includes the steps of:

determining a number of targets in the field of view of the IR detector;

selecting a first one of the number of targets in the field of view of the IR detector;

aiming the laser in the direction of the selected target;

causing the aimed laser to execute a search pattern so as to scan the area about the IR detector reported position of the first one of the number of targets;

detecting the position of the first one of the number of targets from the return of a laser pulse from the first one of the number of targets;

deriving an error signal representing the offset of the IR detector reported position and the laser range finder reported position;

repositioning the transmit mirror based on the detected offset;

selecting a second target in the field of view of the IR detector; and

aiming the laser to the second target using the transmit mirror positioned in accordance with the detected offset.

7. The method of Claim 6, wherein the repositioning step includes a map for setting the position of the transmit mirror, and wherein the repositioning step includes the step of storing the detected offset as part of the map.

8. A method for minimizing scanning time in a dual mode target designator using an IR detector co-boresighted with a laser range finder so as to quickly identify the position of a target in a multiple target cloud, comprising the steps of:

deriving an error signal corresponding to boresight misalignment based on reported target position of a first target derived from the IR detector and laser range finder; and,

for the next target selected repositioning the laser boresight so that it is more perfectly co-boresighted with the IR detector boresight, whereby scanning time for the next target is reduced due to the repositioning.

9. The method of Claim 8, wherein the laser boresight direction is controlled by a laser transmit mirror.

10. The method of Claim 9, wherein the transmit mirror has its position determined by a map and wherein the map is updated with information from the error signal so as to more accurately control the position on a subsequent scan of the transmit mirror and thus the alignment of the laser boresight with the IR detector boresight.

11. A system for correcting the boresight of a laser range finder to match the boresight of an IR detector comprising:

a laser transmit mirror defining the boresight of the laser;

a closed loop controller coupled to said transmit mirror for adjusting the position thereof responsive to a comparison of reported IR detector position of a target with reported laser range finder position of said target.

12. The system of Claim 11, wherein said controller includes a mapping system for the control of said transmit mirror, said comparison resulting in an error signal coupled to said mapping system for instantiating the offset established by said error signal.

13. The system of Claim 12, wherein said mapping system includes a lookup table.

14. A system for rapidly identifying the position of a target in a multi-target target cloud, comprising:

an IR detector for detecting the position of targets in said cloud;

a co-boresighted laser range finder for refining the position of a selected target in said target cloud once the position of said selected target has been ascertained by said IR detector;

a comparator for comparing reported position of said selected target from said IR detector with that of said laser range finder, and for outputting an error signal corresponding to the offset in position between said reported positions;

a laser beam boresight controller coupled to said error signal for adjusting the boresight of said ladar or laser range finder to more closely correspond to the boresight of said IR detector, said boresight controller including a scanning unit for causing the laser beam of said laser range finder to repetitively scan the region of the IR detector reported position until a return from said selected target has been detected; and,

a target selector for selecting a second target, whereby the previous adjustment of the ladar or laser range finder boresight reduces the scan time associated with the scan of said laser range finder in achieving a return from said second target.

15. The system of Claim 14, wherein said boresight controller includes a laser transmit mirror.

16. The system of Claim 15, and further including mapping means for controlling the position of said transmit mirror, and wherein said offset is coupled to said mapping means for altering the information in said mapping means so as to position said transmit mirror taking said offset into account.

17. In a dual mode target designation system having an IR detector co-boresighted with a ladar, a method for actively adjusting at least one of the boresights to be aligned with the other of the boresights comprising the step of:

providing a closed loop system for correcting the boresight of the laser based on a comparison of reported target positions from the IR detector and ladar reported position.

18. The method of Claim 17, wherein the boresight of the laser is adjusted by repositioning a laser transmit mirror.

19. The method of Claim 18, wherein the laser is made to execute a search pattern to scan around a target identified by the IR detector.

20. The method of Claim 19, wherein the target designation system includes detecting a target cloud with the IR detector and refining the position of targets within the target cloud through the use of the ladar, the closed loop correction reducing scan time when identifying the position of subsequent targets in the target field.

21. The method of Claim 18, wherein the closed loop system includes using a mapping system for adjusting the position of the laser transmit mirror, and wherein the mapping system is updated with the results of the comparison of reported target position from the IR detector with reported target position from the ladar.

22. The method of Claim 21, wherein the step of correcting the boresight of the laser includes the steps of:

- determining a number of targets in the field of view of the IR detector;
- selecting a first one of the number of targets in the field of view of the IR detector;
- aiming the laser in the direction of the selected target;
- causing the aimed laser to execute a search pattern so as to scan the area about the IR detector reported position of the first one of the number of targets;
- detecting the position of the first one of the number of targets from the return of a laser pulse from the first one of the number of targets;
- deriving an error signal representing the offset of the IR detector reported position and the ladar reported position;
- repositioning the transmit mirror based on the detected offset;
- selecting a second target in the field of view of the IR detector; and
- aiming the laser to the second target using the transmit mirror positioned in accordance with the detected offset.

23. The method of Claim 22, wherein the repositioning step includes a map for setting the position of the transmit mirror, and wherein the repositioning step includes the step of storing the detected offset as part of the map.

24. A method for minimizing scanning time in a dual mode target designator using an IR detector co-boresighted with a ladar so as to quickly identify the position of a target in a multiple target cloud, comprising the steps of:

deriving an error signal corresponding to boresight misalignment based on reported target position of a first target derived from the IR detector and ladar; and,

for the next target selected repositioning the laser boresight so that it is more perfectly co-boresighted with the IR detector boresight, whereby scanning time for the next target is reduced due to the repositioning.

25. The method of Claim 24, wherein the laser boresight direction is controlled by a laser transmit mirror.

26. The method of Claim 25, wherein the transmit mirror has its position determined by a map and wherein the map is updated with information from the error signal so as to more accurately control the position on a subsequent scan of the transmit mirror and thus the alignment of the laser boresight with the IR detector boresight.



27. A system for correcting the boresight of a ladar to match the boresight of an IR detector comprising:

a laser transmit mirror defining the boresight of the laser;

a closed loop controller coupled to said transmit mirror for adjusting the position thereof responsive to a comparison of reported IR detector position of a target with reported ladar position of said target.

28. The system of Claim 27, wherein said controller includes a mapping system for the control of said transmit mirror, said comparison resulting in an error signal coupled to said mapping system for instantiating the offset established by said error signal.

29. The system of Claim 28, wherein said mapping system includes a lookup table.

30. A system for rapidly identifying the position of a target in a multi-target target cloud, comprising:

an IR detector for detecting the position of targets in said cloud;

a co-boresighted ladar for refining the position of a selected target in said target cloud once the position of said selected target has been ascertained by said IR detector;

a comparator for comparing reported position of said selected target from said IR detector with that of said ladar, and for outputting an error signal corresponding to the offset in position between said reported positions;

a laser beam boresight controller coupled to said error signal for adjusting the boresight of said ladar or laser range finder to more closely correspond to the boresight of said IR detector, said boresight controller including a scanning unit for causing the laser beam of said ladar to repetitively scan the region of the IR detector reported position until a return from said selected target has been detected; and,

a target selector for selecting a second target, whereby the previous adjustment of the ladar boresight reduces the scan time associated with the scan of said ladar in achieving a return from said second target.

31. The system of Claim 30, wherein said boresight controller includes a laser transmit mirror.

32. The system of Claim 31, and further including mapping means for controlling the position of said transmit mirror, and wherein said offset is coupled to said mapping means for altering the information in said mapping means so as to position said transmit mirror taking said offset into account.